

PATENT

Attorney Docket No.: AMAT/8266/CMP/ECP/RKK

Express Mail No.: EV351031994US

What is claimed is:

1. A method for immersing a substrate into a fluid solution, comprising:
loading a substrate into a receiving member configured to support the substrate in a face down orientation;
tilting the receiving member to a first tilt angle measured from horizontal;
displacing the receiving member toward the fluid solution at the first tilt angle; and
tilting the receiving member to a second tilt angle measured from horizontal when the substrate contacts the fluid solution, the second tilt angle being different from the first tilt angle.
2. The method of claim 1, wherein the first tilt angle is between about 3° and about 10°.
3. The method of claim 1, wherein the second tilt angle is about 0°.
4. The method of claim 1, further comprising rotating the receiving member at a rotation rate of between about 30 rpm and about 240 rpm.
5. The method of claim 1, further comprising oscillating the second tilt angle once the substrate is immersed in the fluid solution.
6. The method of claim 5, further comprising oscillating the substrate in a vertical direction once the substrate is immersed in the fluid solution.
7. The method of claim 1, further comprising positioning the receiving member such that a plating surface of the substrate is positioned parallel to an upper surface of an anode positioned in the fluid solution once the substrate is immersed in the fluid solution.

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8. A method for minimizing bubble adherence during a substrate immersion process, comprising:

tilting the substrate to a tilt angle measured from horizontal;

vertically actuating the substrate toward a fluid solution while maintaining the tilt angle;

reducing the tilt angle to about horizontal once the substrate contacts the fluid solution, while continuing the vertical actuation of the substrate; and

positioning the substrate at a processing angle in the vertical actuating is complete.

9. The method of claim 8, further comprising rotating the substrate at a rate of between about 60 rpm and about 120 rpm.

10. The method of claim 8, further comprising oscillating the tilt angle of the substrate after the substrate is immersed in the fluid solution and before positioning the substrate at the processing angle.

11. The method of claim 8, wherein the processing angle corresponds to an angle that an upper surface of an anode positioned in the fluid solution makes with respect to horizontal.

12. The method of claim 8, wherein the tilt angle is between about 3° and about 7°.

13. The method of claim 8, wherein the tilt angle is reduced to horizontal before the vertical actuation is completed.

14. The method of claim 8, wherein the tilt angle is greater than 0° at a time when the substrate becomes completely immersed in the fluid solution.

15. A method for immersing a substrate into a plating electrolyte, comprising:
positioning the substrate on a contact ring;

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securing the substrate to the contact ring with a thrust plate assembly;
tilting the contact ring to a tilt angle of between about 3° and about 7°;
vertically actuating the contact ring toward the plating electrolyte while
maintaining the tilt angle;
rotating the contact ring at a rotation rate of between about 30 rpm and
about 120 rpm;
reducing the tilt angle to about horizontal when the contact ring initially
touches the plating electrolyte; and
positioning the substrate in a processing position.

16. The method of claim 15, further comprising reducing the tilt angle to about horizontal before stopping the vertical actuation.

17. The method of claim 15, wherein positioning the substrate in a processing position comprises positioning the substrate substantially parallel to an upper surface of an anode positioned in the plating electrolyte.

18. The method of claim 17, wherein the upper surface of the anode is tilted from horizontal at an angle of between about 4° and about 10°.

19. The method of claim 18, further comprising oscillating the tilt angle of the substrate after the tilt angle is reduced to about horizontal.

20. The method of claim 15, further comprising maintaining a central axis of the substrate proximate a center of the electrolyte solution during the immersion process.